To Geo Watt Esqre
with the Author's Regards

ESSAY

ON

CHOLERA,

FOUNDED ON OBSERVATIONS OF THE DISEASE IN VARIOUS PARTS OF

INDIA,

AND IN

SUNDERLAND, NEWCASTLE, AND GATESHEAD,

WITH NOTICES OF THE TREATMENT, AND OF THE CIVIL AND HOSPITAL POLICE ADOPTED IN THESE TOWNS.

BY

JAMES ADAIR LAWRIE, M.D.

PROFESSOR OF SURGERY, ANDERSONIAN UNIVERSITY, GLASGOW,
MEMBER OF THE FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW,
AND LATELY IN MEDICAL CHARGE OF THE 53D. REGT., BENGAL NATIVE INFANTRY,
AND CIVIL STATION, MORADABAD.

GLASGOW:

PRINTED FOR JOHN SMITH & SON;

JOHN HAMILTON, EDINBURGH;
AND LONGMAN, REES, ORME, BROWN, & GREEN, LONDON.

MDCCCXXXII.

Glasgow : E. Khull, Printer, 65, Virginia Street.

TO THE

HON. ROBERT DALGLISH, LORD PROVOST,

AND

PRESIDENT OF THE BOARD OF HEALTH,

OF THE

CITY OF GLASGOW.

My Lord,

I deem myself fortunate in being allowed to present this Essay to the Public under the sanction of the name of the Chief Magistrate of Glasgow, and President of the Board of Health, and peculiarly so, when these important offices are filled by one who has long made it his ardent study to ameliorate the condition of that class of the community, in the hope of alleviating whose sufferings under disease this treatise has been written.

That your Lordship's exertions in their behalf may prove eminently successful, and that they may escape the ravages of that dire disease which threatens to overrun the labouring population of our country, is the earnest desire of,

My Lord,

Your Lordship's very obedient Servant,

J. A. Lawrie.

Fife Place, January 18th, 1832.

PREFACE.

THE following observations were intended for publication in the next Number of the Glasgow Medical Journal, as the continuation of a former paper on the subject: but, as that periodical does not appear till February, and as Cholera is now rapidly extending itself over Scotland, I have been induced to give them to the Public in their present form.

In doing so it is perhaps necessary to state, that during a residence of nearly six years in India, attached to the military branch of the Honourable East India Company's Service, in Bengal, I saw as much of Cholera as most of those who entered the service subsequent to the great epidemics of 1817, 18, and 19. I met with the disease in Calcutta, in 1823, while attached to the General Hospital in that capital; it appeared at Purtabgurh Malwa, while I had medical charge of the Rampoorah Local Battalion, and was the only medical officer at the station; I saw a few cases in Neemuch, while in medical charge of the 29th regiment Native Infantry; and, while I was at Bareilly in 1827, in medical charge of the 53d regiment Native Infantry, and 2d regiment Local Horse, the disease raged in the adjacent town in its most malignant form.

After Cholera broke out in the North of England, I was one of the crowd of medical men, whom the disease attracted to that quarter from all parts of Great Britain, and many parts of the Continent. My chief object in visiting Newcastle was to compare the observations I had made in India with the cases which I might meet with in England. I could not have selected a time more favourable for the inquiry. While I was at Newcastle it broke out with all its fury in Gateshead, and besides

seeing many cases in private, I enjoyed the great advantage of acting for a few days as Surgeon to the Cholera Hospital of that town. For the enjoyment of this privilege, and placing within my reach every facility of studying this disease, I beg to take this opportunity of returning my thanks to the Board of Health of Gateshead. It would be ungrateful if I omitted to notice the hospitality and kindness of Dr. Gibson, Mr. M'Intyre, Mr. Brady, and Dr. Charles Abbs, and I can truly say, of all whom I met, that they were unwearied in their endeavours to show the numerous medical visitors private attentions, and to promote the object of their visit.

It may appear to many that farther apology is necessary for the appearance of another Essay on the subject of Cholera. It is true that we have many excellent works written by those who studied the disease in India, but I am not aware of any in which the disease of the North of England is compared with that of India by one who has had opportunities of seeing it in both countries. I presume not to say that this Essay will supply the deficiency, but I offer it to the Public, believing it to be the duty of every man to contribute his observations on so engrossing a subject.

Missing Page(s)
7+8
or Irregular Pagination

FEW subjects have attracted so large a share of interest and attention as Cholera. The talents of the medical profession in all parts of Europe, have been unremittingly bent on the discovery of its laws, its nature, and its treatment—men of chemical and scientific attainments have striven to throw light on those parts of it which are connected with the object of their general inquiries—journalists and popular writers have freely canvassed its modes of propagation—the European public has made it the subject of exciting and daily discussion for many months, yet strange to say, there is not one point connected with it regarding which it can with certainty be said that the truth has been ascertained.

I have already* laid before the public some remarks on the identity of the disease wherever it has appeared, and discussed the laws which regulate its propagation. It will be unnecessary for me again to enter on these points at any length, more especially as I could give no new information regarding the manner of its introduction into Sunderland. Its introduction into Newcastle and Gateshead, and the actual state of the disease in these towns, attracted the chief portion of my attention while there.

* Glasgow Medical Journal, Nov. 1831.

As regards Newcastle, there is reason to believe that it was conveyed thither by water communication from Sunderland. It appeared first in the houses on the quay and its vicinity, whereas the land communication between Newcastle and Sunderland, which is very frequent, all passes through Gateshead. Had it been conveyed by land, it ought to have appeared first in Gateshead or the central parts of Newcastle. Every one knows that it had spread extensively in the latter town before it appeared in the former.

The circumstances attending its breaking out in Gateshead will be discussed in the sequel.

I shall now consider,

First, The mode of propagation of Cholera in Newcastle and Gateshead. Second, Offer a few observations on civil and hospital police as connected with the disease. Third, Discuss the proximate cause of the disease. Fourth, State what I saw of its symptoms and treatment in these towns, and compare it with my former experience in India.

I. The laws which regulate its propagation.

1st, It appears to me, that much injury has been done to the inquiry regarding the mode of propagation of Cholera, by limiting it to the question of contagion or non-contagion. On a former occasion* I endeavoured to prove that Cholera, although certainly communicable from man to man, is not an actively contagious disease—that it assumes at times an epidemic character, and for a limited period is endemic in peculiar localities. The proofs that the disease is com-

* Glasgow Medical Journal, Nov. 1831.

municable from man to man, appear so convincing, and have already been so fully laid before the public in numerous publications, as to make even a summary of them unnecessary. I must enter my protest, however, against the notion that it can be propagated by contagion only, or that it is a very contagious disease. By an actively contagious disease, I mean one in which the bodies of those labouring under it, generate a large quantity of a specific virus capable of producing a similar disease in the majority of those exposed to its influence. To the proofs already before the public, that Cholera does not possess these properties in a high degree, I add the following. Not a single medical man has been affected with this disease in Sunderland, Newcastle, or Gateshead. The same remark applies to the very numerous professional visitors whom the disease has drawn to these towns. All classes of medical men have fearlessly exposed themselves and have added as predisposing causes bodily fatigue, long want of sleep, and great mental anxiety. Some have passed entire nights in the Cholera Hospitals, others whole days; several have used the stethoscope, many applied their ears to the patients' naked chests, and necessarily inhaled their breath and the exhalations from their bodies, with perfect impunity. The melancholy experience of Glasgow* during the last three years, tells us that they could not have enjoyed the same immunity had the disease been Typhus

* Within two and a half years, seven medical men have *died* in Glasgow of Typhus Fever caught in the exercise of their professional duties, and many others have passed through severe attacks.

Fever. Can we avoid the conclusion that Cholera is a much less contagious disease than Typhus?

Of the nurses and other attendants on the sick, only two have had the disease, and one died. Both cases occurred in Sunderland, and as the nurse who died was one of the very earliest seizures, it is highly probable that she caught the disease, in her own house, and not in the hospital. This remarkable immunity of the nurses strongly confirms the statement, that the disease is not actively contagious, because they sleep, (as I have daily seen them do) in the Sandgate Cholera Hospital, in the same room, and in the next bed to four or five patients labouring under the disease. It also casts a very strong doubt on the favourite doctrine of the predisposition of the poorer classes. The nurses are often taken from the very humblest of these classes, and are generally intemperate; and yet they escape. On the whole, the experience of England satisfactorily proves, that Cholera is a much less contagious disease than Typhus Fever, and that in this respect it bears no comparison with Scarlet Fever and Small-pox.*

2d. The second law which regulates the propagation of Cholera, is, that it possesses an epidemic character.—In addition to the arguments† which I have already adduced in support of this law, I add the following:—1st, Its continuance in any given place is very limited. It has already disappeared from Sunderland: Would this have happened had it been purely

* Before visiting Sunderland, Newcastle, and Gateshead, I considered Cholera to be nearly on a par with Typhus Fever in point of contagion.—Vide *Glasgow Med. Jour.*

† Glasgow Medical Journal.

contagious? 2d. Its attacks are at times sudden, and extended over considerable tracts of country. Its appearance in Gateshead illustrates this assertion. Gateshead lies on the right bank of the Tyne, opposite to Newcastle, with which it is connected by a bridge. The population of the town of Gateshead is probably 10,000, and of the whole parish 15,000. The communication between the towns is necessarily very great. Up to the 25th December only two cases of Cholera had occurred in Gateshead, although the disease had prevailed in Newcastle for eighteen days. On the evening of the 25th December cases began to be frequent, and by ten o'clock on Monday morning, forty had been seized, and ten had died. At ten o'clock on the 27th, (Tuesday,) there had been ninety-nine cases and forty-two deaths from the Sunday evening. A most intelligent man, a member of the Gateshead Board of Health, assured me, that he had ascertained by personal research, that the disease had shown itself almost simultaneously in a tract of country three miles and a half around Gateshead. I visited patients in Gateshead-fell, three miles from the town, on Tuesday morning. In one small village there had been ten cases and five deaths. The sudden appearance of the disease in Gateshead was attributed to various causes by those who derided atmospherical influence. The favourite theory was, the dissipation of Christmas day. Was Gateshead the only dissipated place in England on that day? The low part of Newcastle was equally so, and yet a population of 70,000, presented on the morning of the 27th December sixteen cases, a population of 10,000, forty. It was alleged by many, that the wind suddenly changed

on Sunday, and blew during the night from Newcastle. How far this is accurate, I am unable to say; if true, it is possible, that the contagious effluvia may have been borne on the wind from Newcastle, and spread in Gateshead, a soil prepared for their reception. At the same time, when we consider that the alleged change of wind has not been accurately ascertained; that the disease was by no means virulent in Newcastle at the time; and that Cholera has frequently spread in opposition to prevailing winds, the conclusion seems quite legitimate, that it affords an instance of its epidemic character.

3d. I formerly endeavoured to explain the eccentricities of Cholera,* by assigning to it a temporary endemic character; or, in other words, a temporary residence in given localities to the exclusion of others. In India its selections of a locality were so eccentric as to set general rules at defiance. It would depopulate a town, and pass over a neighbouring cantonment. Of three regiments stationed in line, it would attack the two on the flank, and spare the one in the centre. In England, it schoice of situations has been hitherto so much more uniform, as to enable us to reduce them to classes. In towns, they are low, over crowded, narrow, and filthy lanes, more especially on the banks of rivers; and in well-aired country situations, those villages which are surrounded by much external filth, and situate in the vicinity of running streams. To these general rules there may be exceptions, but of their truth, my own observation in the North of England, afforded me sufficient evidence. Sunderland, New-

* Glasgow Medical Journal.

castle, and Gateshead, agree in several remarkable circumstances. They are all towns situate on the banks of a river, in all, the poorer part of the community dwell in narrow, overcrowded, filthy streets and lanes, built on the low banks of the Wear and Tyne, and in Sunderland and Newcastle the richer classes live in well-aired houses, built on elevated ground, which rises by a steep ascent from the rivers. In Gateshead the population is principally composed of labourers, and in all parts of it, narrow, ill-aired streets and alleys abound. In Sunderland and Newcastle the disease has been confined to the low parts of the towns, and has spared the higher. It has shown itself in almost every street and alley of Gateshead, but has been most severe in those on the bank of the river. To those who know these towns it is sufficient to say, that Sandgate Street and its vicinity in Newcastle, Sailors Alley, Warren Street, and their neighbourhoods in Sunderland, and Pipewell-gate and Hill-gate in Gateshead, have been the principal seats of the disease.

Out of Newcastle, I found the disease prevailing at the Seg-hill colliery, and out of Gateshead at Gateshead-fell. The pitmen at Seg-hill colliery, earn with ease, four or five shillings daily; they live well, their houses are clean and well furnished, and their wives and families remarkably neat and well dressed. They are not very intemperate; indeed, the comforts with which they are surrounded, prove that they cannot be so. I saw no personal predisposing cause, and no local, except much filth close to the doors of the houses, and a small rivulet at a short distance. I cannot speak with equal certainty of Gateshead-fell,

but perfectly recollect that the families in which I saw the disease had every appearance of comfort. The houses were good, well furnished and clean. A tributary of the Tyne runs at a short distance, and on the morning of my visit the whole neighbourhood was covered by a dense fog.

Let us now inquire why the inhabitants of these localities suffered severely, while those at a quarter of a mile's distance escaped. The usual reply given to this inquiry is, that the poverty and dissipated habits of the labouring poor predispose them to this disease, and that the poor and dissipated are its only victims. I am by no means inclined to deny, that predisposition exerts a certain influence over the poison of Cholera, and that poverty and drunkenness have a place among its causes—but I cannot admit that they are the principal, much less the sole causes of the predilection of Cholera for certain localities. In the first place, it is not true that the poor and dissipated are its only victims. A viewer's family, in every way highly respectable, and comparatively wealthy, was the first attacked at Seg-hill, and suffered severely. The viewer's house is exceedingly good, of one or two stories, and remarkably neat—but placed close on the bank of the rivulet already alluded to. The pitmen, as I have already stated, are not poor, and not very dissipated; and I met in Gateshead with the disease in young and most respectable females, in whom no personal predisposing cause could be discovered. 2dly. It is a remarkable feature of the Newcastle and Gateshead disease, that very many children, several at the breast, and numbers under six years were attacked with the disease,

and that the vast majority of the cases were females. In every locality the females were as two or three to one male, and in some as high as six to one. If the abuse of ardent spirits is to account for the prevalence of the disease among the poor, the proportions ought to have been the reverse. 3dly. The fact already stated regarding nurses, militates strongly against predisposition. 4thly. One of the localities of the disease in Gateshead bears on this subject. Pipewellgate, is a street running along the right banks of the river upwards from the bridge, one side consists of houses placed next the river, the other of houses built against a damp steep bank. Many cases occurred in this street, and almost all of them on that side built against the bank and farthest from the river—there were very few on the opposite side of the street. 5thly. The greater number of seizures took place during the night and towards morning, a fact more corroborative of endemic than personal predisposition.

It would thus appear that the labourer suffers because the poison which causes the disease is generated in the localities in which he dwells, or because these localities give force to its specific virus; and if a given number of the healthiest and wealthiest families in England, were compelled to live for a week in the hovels which form the wretched abodes of the poor, that Cholera would slay the rich strangers with nearly the same indiscriminate virulence with which it now destroys the permanent residents. The great mortality among the women and children in Newcastle and Gateshead is explained, when we recollect, that in seaport towns the men are employed eight or ten hours daily in a

healthy atmosphere, whereas females and children are exposed day and night to those noxious emanations, which either constitute the poison of Cholera, or in which it delights to dwell. On this principle the disproportion between male and female seizures should not be so great in manufacturing towns as it has been in Newcastle. Time will prove if the theory will stand this experimental test.

4th. The fourth law which regulates the propagation of Cholera is, that the poison which causes the disease is capable of being borne on the wind to a considerable distance from the spot in which it is generated. The following fact was given me by Captain Dunlop, R. N. "In Madras Roads, in November 1821, while I was in command of H. M. Ship Curlew, we were lying with several other vessels, well out in the roadstead, which was filled with shipping. In the course of the night, the wind blowing obliquely from the western end of the anchorage, all the vessels in the centre were visited with Cholera of the most malignant character, and lost several of their hands, while those ships in shore, and those in the outer line sustained no injury. Cholera was at the time partially on the coast."*

Many may be inclined to attribute the sudden appearance of the disease in Gateshead to this carrying power of the wind. Capt. Dunlop mentioned an instance in which the poisonous matter was conveyed, probably from Ceylon, to his ship, passing the island at the distance of 240 miles. The law satisfactorily explains the inefficacy of Sanatory Cordons.

* Letter from Capt. Dunlop, R. N. to the Author.

From this sketch of the laws of Cholera, it would appear that the exciting cause of the disease is a morbid poison received into the system. Of the nature and composition of this poison we are ignorant. It has not hitherto been made an object of sense. It is probably a compound body, possessed of considerable preservative powers, and not capable, under certain circumstances, of much atmospherical dilution. Its sources are probably two: 1st, The bodies of persons labouring under the disease; 2d, Given localities; in this country hitherto pretty well defined. To bring these two sources into full operation, atmospherical influence is probably requisite. The nature of this atmospheric constitution we know not. When all these causes are in operation the disease is widely spread and fatal, when one or more is absent it diminishes and disappears. Of the three classes of causes I believe contagion is the least efficient; the emanations from given localities, combined with a peculiar atmospherical constitution, are irresistible.

I have said that I do not altogether deny the influence of predisposition, and I now proceed to state to what extent I admit it. Mr. Kennedy, the author of a recent excellent and popular work on Indian Cholera, accounts for the spread of the disease on the principles of contagion and predisposition. It is propagated according to this author, by contagion only, attacks all who are predisposed to it, and subsides after they have suffered. I trust I have already proved that the disease is not virulently contagious, and that contagion alone will not account for its propagation.

Let us consider a little more minutely the doc-

trine of predisposition. I fear some confusion has been admitted into this inquiry in consequence of not distinguishing between susceptibility and predisposition. Susceptibility applies to that state of constitution which renders it liable to such diseases as small-pox and scarlet fever, and which one attack of the disease for ever destroys. Predisposition means an ascertainable derangement of the whole body, or any of its organs, which renders it liable to certain diseases, and which, so far from being destroyed by an attack of the disease, is frequently greatly augmented by it. Of this the effects of intermittent fevers are well known illustrations. Susceptibility may be likened to many occult qualities of bodies, whose presence or absence is only ascertained when the proper tests are applied; predisposition is more like palpable material deficiences. For example, two men, in perfect health, may be exposed to the contagion of small-pox, both have been vaccinated, the one efficiently, the other not. The most minute and careful examination cannot discover any *predisposing* cause which is present in the one and wanting in the other. The one man, however, takes the disease, the other, under every degree of exposure, is safe. Neither was *predisposed*, but the one was *susceptible*, the other not. On the other hand, two men, the one in perfect health, the other with enlarged liver, from previous intermittent fever, are exposed to marsh miasmata—both are *liable* to the disease, but one only is predisposed and takes it. Let us apply the above reasoning to Cholera. The vast majority of mankind are *liable* to be seized with Cholera, and one attack does not destroy the liability

to a second. Susceptibility, in the sense, which, for the sake of accuracy, I have assigned to it, does not apply to this disease. Neither does predisposition, because no one has yet been able to say in what that predisposition consists. One family in Gateshead consisted of four young women, apparently of sound constitution, and highly respectable; the eldest was in perfect health—the second was feeble, in consequence of a late severe illness—the two youngest, the one thirteen, the other fifteen, were in perfect health on the 25th December. The two youngest were seized with Cholera on the 26th, the two eldest living and sleeping in the same house escaped. The history of this family is that of a thousand others. Susceptibility and predisposition alike fail us. The explanation must be sought for, by supposing that the two youngest had imbibed a dose of the poison of Cholera, sufficient to produce the disease, while the two eldest had not been exposed to it, or had not imbibed it. At Gateshead-fell, I found in one family the father recovering from an attack of Cholera, one of the family in his coffin, the mother and daughter in bed, ill of the disease. The father told me that he had the night previous been suddenly seized with diarrhœa—he left the house for a few minutes, and on his return three of the family were almost instantaneously seized with the disease. Before morning one was dead. In a second house, I found two dead and two in bed. The probable explanation is, that all were equally exposed to the same local cause, and that the attacks were independent of predisposition.

In what then does predisposition consist? Probably as in other acute diseases in two classes of causes.

1st. The indirect, including whatever weakens or injures the general health or the functions of organs, not implicated in the production of the symptoms of Cholera; as dissipation, poverty, and others similar. 2d. Whatever impairs the actions and functions of the organs concerned in the production of this disease; such as errors in diet, saline purgatives, and extreme cold. The influence which these exert, is probably to the very limited extent of rendering the organs on which the poison of Cholera acts, less able to resist its impressions than organs in sound health, in the same way as general ill health or impaired individual organs place us more under the influence of a given quantity of ardent spirits, laudanum, and other poisons, than we are when free from disease. It has appeared to me, that disease of the mucous membranes, through which the poison probably enters the constitution, may possibly constitute predisposition. This, however, is mere conjecture.

Does fear predispose to this disease? I do not believe that fear ever gave a man Cholera or ever will. To the production of Cholera a regular chain of causes and effects is as necessary as to poisoning by prussic acid. The inhabitants of Gateshead fell asleep on the 25th December, in perfect security and devoid of panic, but before the sun rose on the 26th, fifty-five individuals had been seized, thirty-two of whom were destined not to see it set. For several days subsequent to the 27th, the panic of the inhabitants was greater than I have ever witnessed under any pestilence, while the new cases *decreased*, and on the 30th were as low as 20.

The prophylactic measures which individuals ought

to observe during the prevalence of this disease, are very simple. Every one ought to observe those rules of diet, clothing, and exercise, which personal experience has taught him are most conducive to the preservation of his general health: and as a general rule, the less change that temperate individuals make on their usual mode of life the better. I would recommend the avoidance of those localities in which experience has taught us that the disease prevails, and which have already been pointed out. I would not hesitate to sleep in a well situated Cholera hospital, but I would not remain longer than duty called me, in those houses which Cholera has spontaneously selected for its abode. And this for two reasons; these localities probably generate the poison; they also increase the virulence of the emanations from the bodies of the sick.

I have very frequently been asked, is there more poverty among those whom the disease has attacked in Newcastle and Gateshead, than there is among many parts of the population of the larger towns of Scotland; particularly of Glasgow. I visited many cases of Cholera with my friend Mr. Brady, in Oakwellgate and its vicinity in Gateshead, and saw others in Pipewellgate of the same town, and Sandgate in Newcastle; and no where met with the same poverty, the same over-crowding, the same personal and household filth, which is to be met with in very many parts of Glasgow. In general, the houses had the appearance of considerable comfort. A few patients were admitted into hospital in a state of great wretchedness and filth, but I repeat that it is a mistake to say, that none but the dissipated and the wretched are affected.

Sandgate street, which, while I was there, afforded the greater number of the cases in Newcastle, is situate about fifty yards from the Tyne; it is about eighteen feet wide, and from it runs a dense mass of houses two or three stories high, down to the river's edge on the one side, and on the other, upwards against a steep bank which leads to the higher and better parts of the town. These masses of buildings are intersected by numerous paved alleys about six feet wide. I was told, that previous to the appearance of Cholera, these, and similar localities, presented scenes of extreme filth; at the time I was there, they were thoroughly cleaned, and the houses and alleys white-washed to the roofs. The inside of an Englishman's house, unless he is very dissipated and wretched, is generally comparatively clean and comfortable.

The localities of the disease in Gateshead and Sunderland, are very similar to the Sandgate. In Sunderland I was told, that there existed much more wretchedness and filth before the appearance of the disease, than any which I saw in the two other towns.

II. I shall now put together a few observations on Civil and Hospital police as connected with this disease.

1. Civil police.—By this I mean those measures which the governments of countries, the local magistracy, and individuals ought to adopt, in order to prevent the occurrence and lessen the virulence of this fearful scourge of the human race. If the views which I have given of the causes of Cholera be correct, it is in the power of communities, provided individuals, public bodies, and the government combine,

to expel Cholera, and probably Typhus Fever for ever from their territories. That such a combination will ever be effected, except under the dire stimulus of repeated visitations of pestilence is not to be anticipated. But if, as there is every reason to believe, Cholera take up its abode among us as an endemic disease, and destroy thousands of our population annually, it is to be hoped that no dread of interfering with private rights will deter the government from adopting energetic measures for the preservation of public health.

If I be correct in assigning those states of soil, atmosphere, and bodily constitution which are engendered in the over-crowded lanes of large towns, as the chief causes of the spread of this disease, it follows, that our great aim should be to open up the dense buildings of large cities, widen our streets, limit the height of our houses, avoid the formation of cellars, and build all rooms which are to become the habitations of single families of a proper and commodious size. It may be reckoned presumption in me to allude to such subjects: and I would not had the same views been entertained by men more able to enforce them. So far as I know, however, the subject has hitherto been much neglected in this country, in which of all others, its consideration is most imperatively called for.

Next to free ventilation and the avoidance of overcrowding, comes cleanliness, of the inhabitants, their houses, and the public streets. The sooner all these are made as much matter of law as is consistent with private liberty, the better will it be for the general health of the community. Last, and though last not

least important, stands the improvement of the moral condition of the working classes, a subject at all times difficult, and wholly out of place even for allusion in an essay of this kind, were I not impressed with the conviction, that until they are elevated above their present condition, pestilence in the shape of Cholera and Typhus Fever, will continue to be our periodical and fearful visitants.

2. Hospital Police. It appears to be the duty of every town in the kingdom, instantly to prepare proper accommodation for the reception of patients labouring under Cholera, in anticipation of its appearance. The history of its attack on Gateshead illustrates well the absolute necessity of preparations. The rapidity of its appearance in that town has already been noticed. When it broke out, it found the inhabitants wholly unprepared. Unremitting but unsuccessful efforts were made to establish an hospital, but they long failed in procuring even a house for the purpose. The medical men were most zealous in the discharge of their duties, but could not sustain the fatigue of attending the poor in their own houses. An hospital became absolutely necessary; but after a house had been procured, terror seized the nurses, and they left it; the medical attendant was otherwise occupied; and I fear that this hospital, like every other opened amid panic and confusion, ill prepared, as it must be, with the necessary furnishings and medicines, did not at first accomplish the end for which it was intended, nor decrease the mortality of the disease. I presume not to blame the Board of Health, the exertions of all were most praiseworthy, and the humane and energetic conduct of individuals was

honourable to themselves, and would reflect credit on any Board of Health; and I trust, should these observations meet their eyes, that they will believe me when I say, that I allude to the subject only with the hope of proving to the large towns of Scotland, that energy and humanity are powerless against the deadly eccentricities of this pestilence, except when exerted in anticipating its approach by organized arrangements.

Every town, in which there is a sufficient number of medical men, should be divided into districts, and medical men put in charge of them; and an hospital or hospitals, according to the size of the town, provided in healthy situations. A private dwelling, school-room, or dry barn may speedily be converted into a commodious place for the reception of Cholera patients. If possible, it should have two sets of wards, one for the reception of those in the state of collapse, a second for those in the febrile stage. The furnishings should consist of wooden bedsteads three feet wide, mattresses made of coarse cloth stuffed with kiln-dried straw, sheets, and abundance of blankets. When a patient dies the straw should be burnt, and all the bedding washed. Each ward for the reception of patients in the stage of collapse, should have a stove and a large fireplace to keep up a high temperature, and enable the nurses to procure with facility the means of applying external heat. In this disease, assiduity will often supply the place of skill, and proper measures are more likely to be adopted, when the means of applying them are at hand than when they require to be sent for. If possible, each hospital should contain accommodation for a resident house surgeon.

I need hardly add that the inhabitants of any town of considerable size and wealth ought not to delay making preparations until the disease reach them. Hospitals should be ready for the reception of the sick before a single case of Cholera is heard of in their neighbourhood. They should also be kept up for some years. I should be sorry to be the prophet of evil, but there is too much reason to fear that Cholera, having found a footing among us, will become a disease of our climate, and afflict our populous districts with periodical visitations. Should this prove true, a Cholera Hospital will form a necessary part of the Medical Police of every large town. In many places a melancholy difficulty has been experienced in procuring a house for the reception of Cholera patients. Government, aware of this, should arm local authorities with a discretionary power to employ, for this purpose, public buildings, charity school-rooms, or poor-houses.

A doubt has been cast on the efficacy of hospitals in relieving Cholera. My own opinion is, that in no disease are they more useful. A Cholera patient requires to be treated with a degree of care and assiduity, and demands external agents and comforts which the poorer classes cannot command in their own houses. Far be it from me to hint that the poor do not receive every attention from official medical men, which the nature of their circumstances permits. I am convinced they do—but I am certain that if Cholera invades the larger towns of Scotland, it will be utterly impossible for medical men to undergo the fatigue of attending the poor in their own

houses; and moreover, that they will experience insuperable difficulties in procuring the necessary remedial agents. In an hospital, on the other hand, medical visits at stated intervals during the day and night, together with careful students acting as house-surgeons, will effect more with one-twentieth amount of labour, than the most active can possibly accomplish in the houses of the poor.

In Sunderland I found one excellent hospital, in Newcastle three, and in Gateshead one was got up during my stay there. They were found very useful, but much less so than they will be in such large towns, as Edinburgh and Glasgow, in which the people are in the habit of going readily into hospitals.

A few words are necessary with regard to the disposal of those who die of Cholera. An idea, apparently not without foundation, prevailed in the North of England, that a greater quantity of contagious matter was generated by the recent dead, than by the living. Impressed with this opinion, the authorities directed that interments should never be delayed beyond twelve hours after death. Other rather revolting, and I believe unnecessary precautions were enjoined. Probably all that is required is, to wrap the body in cotton-cloth steeped in oil, remove it early into the coffin, into which chloride of lime should be thrown, and inter twelve hours after death.*

III. I shall now consider as shortly as possible the proximate cause of this disease.

There are two methods by which we obtain infor-

* See Note A.

mation regarding the proximate cause of disease; examination of the bodies of its victims, and attention to the symptoms exhibited during life. On the first of these points my visit to Newcastle afforded me no information; I am not aware that a single *post mortem* examination took place during my residence there. I may, however, remark, that I consider the collections of blood in the larger vessels, the congestion of the capillaries, the changes produced on the blood, and other appearances to be as certainly the effects, and not the causes of this disease, as are the vomiting, purging, and cramps.

My friend, Mr. Geo. Hamilton Bell of Edinburgh, who has written perhaps the very best work on Cholera which we have, says that its proximate cause "is a suspension of the power by which the circulation of the blood is carried on." (p. 69.) The source of this power is the sympathetic nerve, the centre of which Mr. Bell thinks, is placed in the semilunar ganglion and solar plexus. This theory is correct to a certain extent, but I cannot avoid saying, with all due deference to Mr. Bell's superior physiological attainments and practical experience of Cholera, that I think he has fallen into the error of many other writers, of fixing on the morbid derangement of one organ, as the cause of this terrible disease,—a disease which involves the functions of almost every organ of the body. It appears to me, that in our inquiry into its proximate cause, we should divide Cholera into three species: 1st. Simple Cholera; 2d. Spasmodic Cholera; 3d. Cholera Asphyxia, or Malignant Cholera. In the first, simple vomiting and purging, with slight affection of the pulse and animal heat, are the principal

symptoms. The proximate cause of this species, I think, consists in a morbid impression made by a *small* dose of the poison of Cholera on the eighth pair of nerves, and those portions of the sympathetic which supply the intestines. I am as unable to say what the *nature* of this impression is, as I am to explain that of an overdose of salts and tartar emetic on the same organs.

In the second, "Spasmodic Cholera," we have copious rejections of fluid resembling barley water, from the stomach and bowels, violent cramps of the voluntary muscles, and partial failure of the functions of the heart and lungs. The proximate cause of this species, I conceive to be a morbid impression of a *larger* dose of the choleric poison on the eighth pair, the spinal marrow and nerves given off from it, and partially of the sympathetic. This view of the case is supported, 1st, By the symptoms during life. It appears to me to do violence to all the rules of pathological inquiry to say, that spasms, such as are met with in spasmodic cholera, are caused by the *failure* of the energy of the semilunar ganglion. 2d. It is supported by dissections after death. In many instances the spinal marrow has been found diseased. 3d. By the methods of cure. Opiates, antispasmodics, and counter-irritation of the spine, including the red-hot iron, are more useful in this than in any other form of the disease.

Thirdly, Cholera Asphyxia or Malignant Cholera. The cases of this species which I have seen in India and met with at Newcastle and Gateshead, differed from the two last in the following particulars: the vomiting, purging, and cramps, were not the promi-

nent symptoms ; in the majority they were not severe, and in many, one or more of them were absent. On the other hand, in *every* case there was : 1st. Failure of the action of the heart, as indicated by the absence of pulsation at the wrist, and the difficulty, frequently impossibility, of obtaining blood from a vein. 2d. Failure of the *function* of respiration, as indicated by the deadly coldness and lividity of the surface, the diminution of the quantity of carbonic acid in the air expired, and the cessation of the arterialization of the blood. That the failure of the heart's action is owing to the impression of a morbid poison on the ganglionic system of nerves, appears to me to be as clearly proved by Mr. Geo. H. Bell, as any pathological rationale with which I am acquainted. I refer those who doubt it to his excellent work.

I shall now proceed to show, that the other symptoms, deadly coldness and lividity, are owing to the impression of the same poison on the eighth, or pneumatic nerve, destroying its *functional* powers.

In this part of our inquiry we must distinguish between the mechanical and functional part of respiration. By the *mechanical* I mean the action of the external muscles of respiration, and the diaphragm, and the consequent entrance and expulsion of a portion of atmospheric air into the lungs. By the *functional*, the changes which the nervous energy supplied to the lungs, by the anterior and posterior pulmonary plexus, effects mutually on the air and blood, which they contain.

1st, Of mechanical respiration. I ascertained when in Newcastle, that this in almost every instance is unimpaired, and in very many augmented. The

stethoscope proved that at every inspiration the lungs are fully dilated, and that a *larger* than ordinary quantity of air entered them. In only one instance, (Jean Crawford,) I found the mechanical respiration interrupted, probably from spasm of the diaphragm; and it is remarkable that the girl died suddenly of spasm an hour afterwards. In very few could I discover effusion into any of the parts contained within the chest. In almost all the breathing continues perfectly easy until death; in many there are none of those convulsive sobbings which precede death from other diseases, making it very difficult to say, in Cholera, at what time the patient has ceased to live; so calmly and gently are his previously severe sufferings terminated. From all this I infer, that the nerves supplying the external muscles of respiration, the Phrenic, and the recurrents are unimpaired in function. In corroboration of this, we know that cramps are much more violent in those muscles supplied with nerves from the lower portion of the spinal marrow, as the abdominal and muscles of the lower extremities, than those of the chest and arms. The external respiratory nerve, and the phrenic, are given off in the neck.

2d, Functional respiration. If we cut across the eighth pair of nerves below the point, where the recurrents are given off, mechanical respiration continues for many hours, and the breathing becomes difficult before death, in consequence of effusion into the bronchi and substance of the lungs. In Cholera, the blood being rapidly deprived of a large portion of its fluid ingredients, and little blood being in circulation through the lungs, effusion cannot occur, and the pa-

tient dies without dyspnœa. If mechanical respiration can go on while the influence of the brain on the pulmonary plexus is cut off, is not the probability strong, that to these plexus belong the *functions* of the lungs, properly so called: That the *functions* of the lungs are suspended is proved by the following facts:—1st, The deadly coldness of the surface, of the air issuing from the lungs, and of the tongue and palate. I need hardly state my adherence to the physiological doctrine, that animal heat depends on respiration. Those who doubt it, would not be convinced by any arguments I can adduce. I may say, however, that Cholera affords an additional argument in support of its independence of the brain. The functions of the brain are less impaired than those of any other organ; and yet in Cholera animal heat ceases to be formed.* 2d, Less carbonic acid is thrown off in expiration, and the blood is not decarbonized. These are the unquestioned functions of the pulmonary ganglia.

The nature of the present publication forbids the farther pursuit of these physiological inquiries. Their practical importance appears to me unquestionable. Artifical respiration and inhalation of oxygen have been recommended as cures for Cholera; if the powers of the nerves of *functional* respiration be suspended they must prove worse than useless.

* A source of animal heat hitherto, I think, too much overlooked is found in the capillary circulation. Operations for aneurism first diminish and then increase the heat of the limb. They have the same effect on its capillary circulation. Is not the latter the cause of the former? and does not the early cessation of the capillary circulation in Cholera, account in part for the early failure of heat?

I shall sum up the proximate cause of Cholera, in the following propositions :—

It consists of an impression made by a morbid poison,

In common Cholera, on the nerves supplying the stomach and bowels,

In Spasmodic Cholera, on the above nerves, and the lower portion of the spinal marrow, and the nerves given off from it,

In Malignant Cholera, on the pneumogastric nerve, the ganglionic or sympathetic, and partially the spinal marrow and its nerves.

Every medical man knows that on these parts of the nervous system depends the power of locomotion and of animal life, and that they are intimately connected with each other by inosculation of branches and ganglia.

From what has been said, it must be obvious that great changes must be produced on the blood by the suspension of the functions of respiration and circulation, and the very free discharges which flow from the stomach and bowels. Circumstances did not enable me to conduct with advantage experiments on the blood and excretions while in Newcastle. This is matter, however, of mere personal regret, because the subject has been investigated by men of very superior attainments. I have no desire to anticipate by the rehearsal of verbal reports the publication of the results of their investigations, but may state that it is understood in Newcastle that the saline portions of the blood have been found absent from the blood itself, and present in the dejections, and that urea has been found in the

same evacuations in considerable quantity. Hermann of Moscow found the proportion of the clot of choleric blood increased, that of the serum diminished.

IV. I now proceed to the consideration of the symptoms and treatment. In the last Section I divided Cholera into three species—the common, spasmodic, and malignant. I may take this opportunity of repeating what I endeavoured to prove on a former occasion,* that they all belong to the same order of disease, and that their difference consists in a milder poison, or a smaller dose, acting on different classes of nerves, and producing milder symptoms. They are all met with in the same epidemic.

It will be unnecessary for me to occupy much time with the consideration of the two first species. The first is at all times a manageable disease.

The spasmodic species is characterised by a sudden attack of copious vomiting and purging, at first of the contents of the alimentary canal, afterwards of the watery fluid, so well known under the name of rice-water dejections—pain and griping in the bowels, cramp of the muscles of the abdomen, thighs and legs, rapidly supervene. The pain is frequently excruciating; the pulse at first is not much affected; it soon becomes quickened and enfeebled, but is long of becoming imperceptible; the breathing is not unnatural; the surface is shrivelled and colder than in health, but seldom loses its heat to the death-like extent observed in the malignant species; the countenance is shrunk, and the features sharp, haggard, and expressive of much anxiety and suffering. Rarely is the skin exten-

* Glasgow Med. Journal.

sively discoloured. The normal secretions are interrupted or suspended. If medical aid be early obtained, a cure is usually effected—if not, the patient may sink into the stage of collapse about to be described; or he may continue for some time unalleviated, and perish after several hours, exhausted by the amount of the discharges, and the violence of the spasms. Such is a sketch of this species. I have avoided considering it minutely, as the public are already in possession of a sufficient number of accurate accounts of it.

Its treatment consists in early bleeding, opiates, and antispasmodics, with calomel in large doses, to allay the irritability of the stomach and bowels—the warm bath in the early stages, dry heat in the latter with frictions and schampooings to the cramped muscles.

3d. Malignant Cholera, or Cholera Asphyxia. The work of Mr. George H. Bell contains an excellent description of this disease as met with in India. The following account is taken from the cases which I saw in England. I think the malignant Cholera of the North of England, may, with advantage, be divided into five stages, each presenting peculiarities of symptoms, and demanding different treatment. 1. The premonitory, 2. Acute, 3. Collapsed, 4. Rallying, and 5. Febrile, stages.

1. The premonitory stage. In the great majority of cases this consists of diarrhœa, and general derangement of the constitution. There are, no doubt, cases in which the acute stage is the first, but the general rule is that it is preceded by the premonitory. The patient complains of want of appetite, feels himself chilly, has headache, giddi-

ness, noise in his ears, and his feet are deadly cold. He has sudden calls to stool, and at first discharges the contents of the bowels in a liquid form with griping pains. The griping pains cease, the stools are passed easily, and consist at times of a clear fluid, in the centre of which a flocculent matter is partly deposited and partly suspended; at others they have the appearance of water, with an admixture of chalk or milk. The countenance now begins to shrink, the expression is peculiar, the eyes sunk and surrounded by a dark areola. I have seen this very well marked in children, regarding whom their parents, not aware of the danger, did not consult us although in their houses visiting other members of the family in more advanced stages of Cholera. On being questioned, the diarrhœa was almost uniformly discovered. The extreme parts of the body now become cold and blue, as the fingers, toes, nose, and ears. When the stools become watery, the secretion of urine is either lessened or suspended. Spasmodic twitchings of the limbs not unfrequently accompany the diarrhœa, and give very certain indications of its dangerous tendency. Several of the attendants on the sick complained of occasional nausea and slight cramps. I believe they were the natural effects of over-fatigue, and the scenes in which they were hourly occupied.

This diarrhœal premonitory stage is uncertain in its duration, varying from a very few hours to two, four, or even six days.

2. Acute stage. This also varies considerably in its symptoms, but is always rapid in its progress. In some it consists of a very sudden increase of the ex-

isting symptoms. The discharges already described flow from the bowels in immense quantities—the spasmodic twitchings increase—there is no vomiting—the pulse sinks—the surface becomes cold, and the stage of collapse speedily supervenes. In others, again, vomiting, of matters very similar to those dejected, takes place—the spasms, though very rarely so severe as in the spasmodic disease, are acute—the pulse continues good, and the surface not very cold—the tongue is white and clammy—thirst urgent, but rarely so much so as in the stage of collapse—there is often acute spasm at the pit of the stomach, and almost constantly a burning unquenchable gnawing sensation. The sinking of the eyes and areola increase; the fulness of the face subsides, the features become more sharp, and the expression indicates anxiety and much suffering; the patient evidently endures much, he is uneasy and constantly tossing, he sighs deeply, and existence seems a burden to him. Respiration at this stage is full and free, but rather slower than usual,—the secretions diminish, that of the urine is suspended,—if the infant cry tears cease to flow, and the clammy mouth and unceasing desire for liquids point out the condition of the salivary glands. The skin is usually clammy, and at times the perspiration is profuse. I know not if the fluid thrown off has been analyzed. The voice becomes affected, and has a hoarse husky sound. A vein opened usually yields blood freely. This stage may be very short, and some hours may elapse before the pulse disappear, and collapse be fairly established.

Such is the ordinary history of the acute stage. In some cases its attack is instantaneous, and the

symptoms already detailed come on in rapid succession, without warning. In others, the patient falls suddenly senseless ; he is taken up convulsed, and partially recovers only to be plunged into more prolonged agony. A labourer returned one evening from work in perfect health, he had reached his own door in the neighbourhood of Sandgate Street; he suddenly fell senseless; his intellect was soon restored, and he passed rapidly through the stages of malignant Cholera. I have already stated, that in Gateshead-fell, a man had been complaining of diarrhœa, when suddenly he found three of the members of his family, almost simultaneously seized with the symptoms of the acute stage. These instances exemplify the various modes of attack of the acute period.

No class of symptoms is invariably present in any given number of cases. In some there is free vomiting with little purging, and the reverse. In others both are present, but in a very mild degree ; in a third set, affection of the circulation and the function of respiration, suppression of secretion, and restless anxiety, form the prominent symptoms.

3d. Stage of Collapse. This stage is the prolongation or rather termination of the last. Vomiting and purging are rarely troublesome, and although cramps occasionally show themselves they usually are not very severe. The feet and hands are affected with twitchings ; the fingers are closed, and if opened immediately return to the bent position with a spasmodic catch. Sometimes the cramps proceed to the extent of partial or complete tetanus. The prominent symptoms are, 1st. Failure of the circulation. In every instance the pulse is imperceptible at the wrist

or if it beat, it does so slowly, and by flickering movements, at irregular intervals. In the earlier and less severe stages, it is felt in the brachial and iliac vessels, later in the collapse it disappears from them also, and the heart itself is heard to beat with an irregular tumultuous action. Patients are very often restored after the pulse has ceased at the wrist; rarely when the larger arterial trunks communicate no impulse to the finger. 2d. Failure of the function of the lungs. The surface is deadly cold, at first of the limbs, afterwards, of the whole body; the lips, tongue, and palate are in the same condition; no heat has been acquired by the air expired, and it contains little carbonic acid. The surface towards the middle and termination of this stage, and at times at an earlier period, acquires a new colour, varying from a slight change of the natural shade, to the deepest blue or purple. At times it has a deep leaden appearance, resembling the discolouration produced by the too long use of nitrate of silver. I have seen the whole body thus shaded, but in general it is deepest on the lips, face, neck, and extremities, and often limited to these parts. The hands and fingers are in all cases shrivelled, and in many have the peculiar appearance of those of a dead body long steeped in water. It is somewhat extraordinary that a skin in this condition should force from its surface a profuse cold perspiration, at times excessive in the earlier parts of the stage, and towards its fatal close communicating to the hand a damp, clammy, unearthly sensation, such as I have never experienced under any other circumstances. One starts when one hears a patient so situated breathe, and answer questions rationally. If we ex-

cept the discharge from the skin and that from the stomach and bowels all the secretions seem dormant. The intonation of the voice gradually becomes less distinct, and at last the patient can speak only in a whisper.

As regards the sensations and intellectual faculties, we may divide this extraordinary disease into two classes; in the one, the sensations remain and the intellectual powers are little impaired—in the other, the sensations are deadened and the mind weakened. By *the sensations* remaining, I mean that the patient is alive to his sufferings, his feelings are evidently those of extreme agony; he throws about his hands, tosses from side to side, and calls incessantly for cold water to relieve (as I heard a medical friend strongly express it) "the hell which seems burning within him." The surface is peculiarly sensible to heat, he withdraws his feet and limbs from heated bricks and sand, and cannot endure on his body a temperature which the healthy skin can easily bear.* The mind in some cases is quite entire, the patient answers questions, and is capable of keeping up a train of thought. Such cases represent a living soul inhabiting a lifeless body, or to use the words of the celebrated Magendie, "a soul without a body." The mind continues in this state, in some cases, to a very short period before death.

In several instances I found the sensation nearly

* I remarked this particularly in one woman whose surface was deadly cold, and over whom I laid a folded sheet filled with heated bran. I felt no uneasiness when I supported it on the back of my hand, but the moment it came in contact with her surface she exclaimed, "You are scalding me."

extinguished, and the mind much impaired. Such cases reminded me very much of the first stage of concussion of the brain; the patient can be roused to answer in monosyllables, but cannot keep up a train of thought, and lies, when undisturbed, in a dull semicomatose state. He may be pricked with a lancet on the hands and face, without exhibiting signs of pain; deafness is a feature of some of these cases. We are surprised to find a patient apparently at the very ebb of existence, when roused by internal sensations, as calls to go to stool, suddenly start up in bed, almost fling himself out of it, and demand to be taken to the night chair. Reasoning with him is useless, the controlling power of the mind has fled, and he seems to obey the impressions of his sensations with an irresistible impulse. These efforts if not restrained very frequently prove fatal. I saw two patients expire in the act of being lifted to the night chair, and the nurses of the Sandgate Hospital told me that very many of their patients died in the erect posture. The breathing is deep and calm, but rather slow; the stethoscope proved that the air cells were fully dilated.

The majority of medical men affirm, that the mind is *always* unimpaired. I can only say that it appeared to me in many cases affected, to a degree little short of what we find it in concussion of the brain, probably owing to congestion in the vessels of the head. I remarked this particularly in several children. When undisturbed they lay in a dull sleepy semicomatose state, breathing with perfect calmness. When roused, they thought only of relieving their distressing sensations, and vociferated for cold water.

I had at one time five of the same family in one bed, all calling loudly for fluid to allay their burning thirst. So urgent were they, that they could be bribed to swallow any medicine, by the promise of a mouthful of cold water. When appeased, they relapsed into their previous sleepy condition.

It is hardly necessary to say, that confirmed collapse is a state of extreme danger, and that it is it which destroys the vast majority of Cholera patients. The cause of death in many cases, is a failure of the functions of animal life alone; in others, affection of the brain, induced either by venous congestion or the absence of arterial blood, hastens the fatal termination.

I am borne out in this last view of the cause of death, by the fact, that although the powers of animal life are first affected, they are in some cases the last destroyed. Convulsive movements are common after *mental* life is quite extinct; and, as I formerly remarked, it is almost impossible to say at what moment the vital motions have ceased to vibrate. A body lies apparently lifeless, suddenly a convulsive shudder shakes it; its hands are clenched, if you put your own within them, and force them open, they shut again with a spasmodic catch. It is not to be wondered at if these appearances have a powerful effect on the superstitious feelings of the uneducated, and make them averse to very early interments.

4th. *Stage of Rallying.* By rallying I understand the first steps towards health or reaction. It is a remarkable fact, that in some of the most rapidly fatal cases which I met with, the heat partially returned to the surface—the pulse flickered at the wrist, and

sensation was slightly restored, immediately before death. It seemed as if animal life destroyed itself by a last futile effort at prolongation.

As in other diseases of collapse, rallying consists in a return of heat to the surface, a renewal of pulsation, and a restoration of sensation and secretion. In some cases the rallying is complete and rapid, and the suspended functions, although weakened, are restored to comparative health; these, however, are the exceptions, and the rallying stage is usually one of some hours' duration, (I have seen it of two or three days,) in which the animal powers seem as it were placed in the scale of a delicate balance—depletory or depressing measures would replunge them into collapse—unguarded stimulation would throw them into overaction. The pulse flickers, it beats and ceases at intervals, and the body is at times warm, at others suddenly becomes cold. At length the scale is fairly turned in favour of the vital power, and the heat and pulse become steady.

5th. *Febrile Stage.* A patient who has fairly entered the stage of collapse, is rarely restored to health, without passing through a fever closely resembling typhus. My residence in Newcastle was too short to enable me to say from personal observation, what is its ordinary duration, but I understood that it varied from seven to fourteen days. The ordinary cases present no peculiarities of symptoms which could distinguish them from those of common continued fever. At first I thought the tongue cleaner, and the pulse less rapid; but more extended observation showed, that these, especially clean reddish tongue, are occasional, but by no means invariable symptoms.

Congestion of particular organs is met with at the commencement or during the progress of the febrile stage. By far the most common is that of the vessels of the brain, marked by apathy, listlessness, dilatation of the pupils, suffused eyeballs, low muttering delirium, or total insensibility. The fauces, in some cases, in which the voice had been much affected, inflamed, and suppurated. Inflammation of the brain followed one case of inflamed throat. The chest I rarely found affected. The respiration in the febrile stage is usually healthy, and the lungs free from congestion. I do not pretend to say that affections of the chest have no place among the sequelæ of Cholera, but that I have not met with them.

Congestions and inflammatory affections of the abdominal viscera are very frequent; indeed it seldom happens that the functions of these organs are speedily restored. Under proper treatment the liver is not very obstinate. I thought affections of the stomach, probably its mucous surface, as indicated by troublesome retching and vomiting, and of the bowels, in the shape of constipation, fulness, and pain on pressure, much more common. The secretion of urine is restored, the skin assumes its ordinary hue, and attains a febrile heat. The recovery is progressive, as from continued fever.

After the description which I have given of the symptoms of the Sunderland Cholera, it is hardly necessary for me to say that I consider it to be the same disease which I met with in India. I may state that the account given is taken solely from the cases which I saw in the North of England, that I have pur-

posely avoided reading any of the accounts published regarding it, even the letters of the celebrated Magendie, and that I have endeavoured to divest myself, as much as possible, of previous impressions. My object in doing so was to enable me to compare what I had seen in India with the unbiassed impressions which observation of the English disease might make upon me. The result of the comparison is, that I consider the diseases to be essentially the same, but that the English disease is characterised by the following peculiarities.

First, The premonitory stage occurs in a much larger proportion of cases in the English than in the Indian disease. In the latter it was the exception, in the former it is the general rule.

Second, The febrile stage is incomparably more frequent. I have met with it in India, but it generally appeared to me to be connected with derangements of the abdominal viscera. In Sunderland and Newcastle the experience seems to be, that very few who have fairly entered the collapsed stage, escape the secondary fever.

Third, I think the head is more frequently affected in the British disease than in the Indian—as indicated by greater mental oppression and insensibility during the collapse, and more congestion in the febrile stage. In this last particular, I believe I differ from some other observers. I speak, however, of my own experience only. My observations would also lead me to say that the frequent discoloration of the surface constitutes a fourth peculiarity. I neither met with it so frequently, nor to the same extent in India.

Apart from these peculiarities—listening to the his-

tory of the case, then putting our hand on the patient's cold, clammy, pulseless arm—looking at his sunk haggard features—watching his incessant tossings—and hearing him beg for cold water to quench the fire within—is sufficient to satisfy the most sceptical, that Asiatic Cholera, one of the direst scourges of our race, has been added to the already long list of British diseases.

Treatment.—I proced to consider the treatment. A glance at the various stages of Cholera must satisfy every man at all acquainted with disease, that the search after a specific for its cure is hopeless—we must prescribe for symptoms, not for names, and where there is such variety of appearances there can be no uniformity of practice. My object in dividing the disease into minute stages is to endeavour to ensure the application of the proper remedies to the existing symptoms.

First, Diarrhœal premonitory stage. When Cholera prevails I would neglect no case of diarrhœa, more especially when combined with spasmodic twitchings and shrunk features. The patient should be put to bed, kept warm, and a flannel band applied round his abdomen. He should have instantly half an ounce of castor oil with fifteen or twenty drops of laudanum, followed, after one or two free operations, by thirty drops of laudanum or one grain opium. I may take this opportunity of saying, that I consider simplicity as the soul of good practice in this disease; the remedies should be small in bulk, and of as few ingredients as possible. Prescriptions made up of camphor, ipecacuan, conserves, opium, calomel, and countless other drugs are worse than useless. Let whatever

is done be for the accomplishment of some given end.

Saline and drastic purgatives cannot be too strongly condemned in this stage, and we must beware not to wait for a specific effect from the oil. If the discharges continue, the opiates must be given and repeated, with the caution of not carrying them so far as to predispose to fulness of the vessels of the head. Two or three grains of soft opium failing, if the patient be robust, I would open a vein, and in any case apply a sinapism or blister to the abdomen. Bleeding in the diarrhœal stage was found very beneficial among the pitmen at Seg-hill, under the care of my friend, Mr. M'Intyre. When the above measures fail, if collapse threaten, we should endeavour to rouse the system by a mustard emetic. A tea spoonful of powdered mustard in a pint of tepid water empties the stomach very mildly, and instead of leaving the depressing nauseating effects of other emetics, excites arterial action. It should be followed up by ten or twenty grains of calomel, with as much laudanum or opium as the state of narcotism of the patient from previous doses will permit. To allay the irritation of the rectum, opiate enemata under the same restrictions, deserve a careful trial. If the opiates have already been pushed to the verge of safety, large quantities of a bland tepid fluid, such as thin gruel or infusion of lintseed should be thrown into the rectum. Two or three pints may be given at a time, and pressure used to prevent its discharge. Juke's apparatus for this purpose should be in the possession of every family.

Such is a sketch of the treatment of this stage. It has no peculiarity except energy: other measures may

suggest themselves to every medical man: the indications are sufficiently obvious; to allay the irritation of the bowels by oil and opiates, counter-irritation and enemata; to restore healthy secretion by calomel; and prevent incipient congestion by the lancet and emetics.

The public should be impressed with the impropriety of neglecting bowel complaints; and the working classes apprized by proclamation, that diarrhœa is the parent of Cholera, and that in this stage the vast majority of cases are within the reach of medicine.

Treatment of Second or Acute Stage. Energy and simplicity of treatment are more necessary in the acute stage of Cholera, than in any disease with which I am acquainted. In the very mildest cases this stage is not of long duration, and in the severe, it too often is so short, that the patient has passed through it before the medical attendant can arrive. Moments are valuable, and it is necessary that we have our mind made up as to what should be done. Let us suppose, that we are called to that form of it which consists of a sudden and violent increase of the symptoms of the premonitory stage, that there has been purging with the other symptoms described, but little or no vomiting; our indications are to rouse the energy of the stomach and heart, relieve the circulating system of a portion of its fluid, keep up the heat and allay irritation and cramps. The stomach is best roused and emptied by emetics of mustard or salt, or of the two combined. A teaspoonful of mustard powder to a pint (tumbler) of warm water is sufficiently strong; the strength of the

salt emetic may be two table-spoonfuls to the same quantity of water. The advantages of these emetics, over all others are, that they empty the stomach rapidly, or if retained, produce no unpleasant effect, and far from leaving behind them the depressing nauseating influence of antimonials, they rather rouse arterial action. In the use of the mustard, experience taught me not to give it too strong, in cases where there is difficulty of breathing, or to infants. I have seen a patient almost suffocated by the spasm of the muscles of the windpipe which attempts to swallow it produced.

The employment of emetics in Cholera, rested, in Newcastle, on an analogy between the stage of collapse and the effects of carburetted hydrogen, called by the pitmen choke damp, on those employed in the coal mines. The men exposed fall senseless, livid, and without pulse, and unless relieved by medical aid, inevitably die. The mustard emetic is a popular remedy, and I was told by medical men, who had met with numerous cases of suspended animation from this cause, that whenever the sufferer can be made to vomit speedily, he is safe. If he cannot swallow, a solution of mustard, thrown into the stomach by means of the stomach pump, or a tube and syringe, acts on the organ, and procures immediate relief.

The analogy between the symptoms and treatment of the two diseases is very striking, and if properly investigated, may throw light on the exciting cause (the poison as it is generally called,) of Cholera. Whether the emetic acts by exciting the suspended functions of the heart and lungs, or by removing offending matters from the stomach, I know not, but

if my memory do not deceive me, I was told that the matters vomited are very dark.

Supported by this analogy and other considerations, the propriety of giving emetics in those cases of Cholera in which vomiting has not occurred, or in which after vomiting the stomach has become torpid, seems unquestionable. It may be doubted if their efficacy or safety is equally great, where profuse vomiting of colourless fluid is a prominent symptom. As a general rule, however, a mustard or salt emetic is a good prelude to more active treatment.

Bleeding is the most effectual method of relieving the heart and guarding against congestion. It should be had recourse to without the loss of a moment. Where there is much oppression, and we dread torpidity of the stomach, the emetic and lancet should be so managed that the operation of the one may assist the other. The loss of blood will assist the stomach, and the stimulus of the emetic enable us to obtain more blood and guard against its secondary depressing effect. So soon then as an emetic has been swallowed, a vein should be opened.

There are few remedies regarding whose efficacy there has been more discussion than bleeding in Cholera. Some, as Mr. Kennedy, endeavour to explain this discrepancy of opinion, by saying, that it arises from not discriminating between real and apparent debility. This cannot be, because the general rule is, "bleed when blood can be obtained," and because there is no analogy between the debility of the first and second stages of Cholera, and those of fever or inflammation. In the last, the causes of the two stages of debility are different; in the first, the

debility of the second stage is produced by the same cause, and differs only in degree from that of the first. Light yet remains to be thrown on this important subject, and I regret to say, my experience does not enable me to point out the source from which it may be looked for. I conceive that no man is justified in talking with certainty of the ascertained efficacy of a powerful but questionable remedy, in any disease, unless he be satisfied that his experience be based on a sufficiently broad foundation. I have seen a good many cases of Cholera, and must say, that I cannot explain the good effects of the lancet, in some cases, and its injurious in others. The following are offered as suggestions on this subject:—

The unhesitating advocates of this practice say, that whenever they have succeeded in taking away twenty or thirty ounces of blood their patient has recovered. This statement, I doubt not is correct, but I believe the patient did not in every instance recover because he lost the blood, but because the mildness of the attack allowed the blood to flow; in other words, the quantity of blood lost was a proof that the attack was mild. It is rare indeed that thirty ounces of blood can be obtained from a Cholera patient, after the symptoms are so well marked as to justify us in saying that the disease is characterised by great malignancy.

Again some practitioners condemn the lancet, because many patients die who have been bled, forgetting that Cholera is a disease far more fatal than any other with which British practitioners of the present day are acquainted and that deaths must be frequent under the most scientific treatment.

Laying aside these extremes, let us inquire, does

bleeding prove more useful in severe examples of the acute stage of Cholera than other remedies? My own experience and that of the majority of medical men with whom I have conversed, is in its favour. I am not one of its unhesitating advocates, at the same time, I consider it to be one of the best remedies which we possess against a disease, which too often baffles every plan of treatment. The amount of blood drawn must depend on the age and strength of the patient, the effects which the quantity procured produces on the system, and on its influence in restoring the blood from a thick tar-like fluid, to its natural consistence and colour. I conceive that the rules which guide us in the use of the lancet in other diseases, are applicable to its employment in Cholera. It is unnecessary to detail the numerous cases in proof of its efficacy which I met with in England. As a general rule, the earlier it is used the better.

It must not be concealed, however, that in several cases blood-letting has appeared to do harm. This I know is the opinion of several practitioners both in India and Europe. The following is a case in point. *Case 1st.* Mary Rose, æt. 45, was admitted at 6 P. M. December 28th, 1831, into the Gateshead Cholera Hospital, labouring under well marked symptoms of Cholera. She had been ill for two hours, the pulse was of good strength, the symptoms were those of what I have named the acute stage. A vein was opened, the blood flowed freely, and a moderate quantity was taken. In ten minutes the pulse failed and soon disappeared, she became cold, collapsed, could not be made to rally, and died next morning.

This is by no means a solitary case; it is the occurrence of such, which alone ought to throw a ra-

tional doubt over the employment of the lancet, and induced me to say, we still require some light on the subject. The following is a summary of all that I know regarding it.

1st. The earlier the lancet is employed after the occurrence of acute symptoms, the safer and more useful will it prove.

2d. As in other diseases it is most useful in the robust and well fed, even in them, however, a doubt hangs over its efficacy; a friend of mine in India found it so apparently injurious in his treatment of robust Europeans, labouring under this disease, that he abandoned it.

3d. It is probably less safe when the acute stage is on the point of passing into collapse, than after collapse has been established.

4th. It is safe in moderate cases of Cholera, and very useful in arresting their progress. Its safety or efficacy is probably more questionable in those cases in which, according to the theory expounded in this essay, a large dose of the poison has been imbibed, and acts principally on the pneumatic portion of the eighth pair of nerves.

My observations have not been sufficiently numerous to confirm or refute these probabilities. So far as they have extended they are supported by cases, and surely it ought to be the earnest desire of every medical man to ascertain, what are the symptoms which indicate the safety and utility of the lancet, and what those which forbid its employment or render it doubtful.

Having acted on the stomach by an emetic, and taken blood from the arm, our next indication is to

allay irritation. This is best done by a large dose of calomel and opium, as ten grains of calomel and two of opium in pills, or the same quantity of calomel mixed with forty or sixty drops of laudanum in a tea spoon. As there is much difference of opinion as to the use of calomel and the preparations of opium in this disease, I may take this opportunity of stating my opinions regarding them. Combined with opium, calomel in this stage allays the irritation of the stomach and bowels better than any medicine with which I am acquainted; I know from much personal experience that it will remain on an irritable stomach when nothing else, either in the shape of food or stimuli can be retained. It has also a specific action in restoring the natural secretions of the stomach, liver, and bowels; and we know that so soon as a restoration of proper secretion is effected the patient is safe. The appearance of bile in the matters rejected is justly esteemed a very favourable symptom. The quantity of calomel to be given must depend on circumstances of which the medical attendant can best judge; but to a stout man, in the acute stage, whose symptoms did not yield to the first doses, I would not hesitate to give within two hours thirty grains. Like all other remedies, it must be used early, and if it produce no effect, after from twenty to thirty grains have been given, we must place our confidence in other measures.

Opium in all its forms was a favourite remedy in India, and frequently could be pushed with safety to a very considerable extent. In England congestions of the head being a very frequent occurrence, we must be more guarded in its exhibition. A larger dose

should be given at first combined with calomel, two grains of the powdered or soft opium or sixty or eighty drops of laudanum form a full dose for a man. In repeating this or a smaller dose, several circumstances must be attended to. The matter vomited, subsequently to the dose being given, must be carefully examined to endeavour to ascertain what quantity has been retained. If the whole has been retained, and no effect produced, it is probable that the stomach is not in a state to be acted on by this or any other remedy, and that to push it would do no good, but on the contrary, expose the patient to danger by accumulating a medicine which might powerfully affect the head when the action of the stomach came to be restored. If it produce a speedy narcotic effect our object has been attained, and a repetition of the dose would do harm. Next to the lancet, opium is the most difficult remedy to manage with skill and safety in Cholera. It has two effects in this disease, a narcotic and a stimulant. The difficulties in employing it are the dread of an over-dose, and that its diffident use may deprive the patient of the full effect of a powerful medicine. A large dose at first, and attention to the circumstances pointed out, will probably avoid the two extremes.

An opiate enema may be given to allay the irritation of the rectum, before it might be safe to repeat the medicine by the stomach. This failing, large quantities of warm water may be thrown up in the manner already recommended for diarrhœa.

The constitutional treatment being advanced to the stage described, we have time to adopt local measures. Our object in using them is to allay the local

effects on the nerves implicated, and excite them to healthy action. A mustard poultice should be applied to the throat, to affect the eighth nerve and ganglia of the neck, and another over the region of the stomach, to excite that organ, and possibly influence the semilunar ganglion. The lower part of the spine should next be attended to, and the same remedy applied to it; or it may be rubbed with spirits of turpentine, hartshorn or an infusion of capsicum in strong whisky or acetic acid. A cloth dipped in hartshorn, or the infusions of capsicum, and steadily applied to the spine, will at this stage produce severe external irritation. The strength of the infusion may be one ounce of capsicum to six or eight ounces of strong whisky or spirits of wine. These failing, and the stage of collapse approaching quickly, the red hot iron should be applied along the spine, especially its lower part. This remedy has been found useful on the Continent. Circumstances prevented its employment in the North of England; but I trust there is no impropriety in saying that it is one which suggested itself to my mind long before the accounts of its success were published. I would also recommend the same remedy over the eighth pair of nerves high in the neck. The scars which it leaves are objections to its use in this situation, but it might be tried first on men, and its use extended or rejected according to its effects. It should be applied at or near the angle of the jaw. If found beneficial, its use might be farther extended to the course of the ganglia of the sympathetic, and the region of the stomach. Early in the acute stage, counter irritants are very useful—and in addition to the parts already mentioned, I

have seen considerable advantages obtained from their application over the lower part of the belly. In this situation, mustard cataplasms, or if time permit, blistering plasters are the best. I say, if time permit, because it is well known that blisters will not affect the skin in the stage of collapse. The pulse failing, and the surface becoming cold, we must try to excite the heart by counter irritation and rubbing over its region, and adopt measures for increasing the heat of the surface. The means of applying external heat in this disease, will be fully discussed when I treat of the collapsed stage; at present I may say, that the principles which guide their employment in the two stages are the same.

At this period, if the stomach can retain them, we must give stimulants. This class of remedies will also be best treated of in the next section; but I may remark that, at this period, plain diffusible stimuli, composed of very few ingredients, are most likely to be retained by the stomach. They should not be much diluted, and given in small quantities at a time. Brandy and hot water, either plain or combined with ether, ammoniated spirits, or tincture of capsicum, is the best we can use. Half a wine-glass-full of brandy, with forty drops of laudanum, and a tea-spoonful of ether, may be given as a preparatory dose, before the arrival of a medical man; but it must not be forgotten that excessive stimulation from brandy will produce the same injurious effects on the head as those which follow an over-dose of opium. The danger of giving too much brandy is greater in England than it was in India, for the reason already stated. The rules which direct the use of stimuli are analogous to those for the employment of opium.

3. Stage of Collapse. If the medical man, on first seeing his patient, find him pulseless, cold, and labouring under the other symptoms which characterize collapse, he must instantly put him between warm blankets, and employ those means for restoring heat which can soonest be procured. Not a moment must be lost in the adoption of these measures. An emetic, as recommended for the acute stage, must next be given. In the severer forms of collapse the stomach cannot be acted on by any emetic; its nervous energy is gone, and life is supported by the vitality of the brain. In such cases it has been proposed to use the stomach pump, and although our prospects of success from any measures are very small, there can be no objection to its employment. The contents of the stomach should be drawn off and replaced by a strong dose of mustard, salt, and brandy, in a pint or two of hot water. If these have no effect the case is bad indeed.

In the early part of this stage, while the pulse is felt in the brachial artery, taking a few ounces of blood, is always useful. It is only, however, in the very earliest period that blood can be procured by any measures, or is likely to do good. *Case 2d,* A woman, apparently about forty, and robust, was admitted into the Sandgate Hospital, in Newcastle, at 11 o'clock, on 24th December. She had been taken ill during the night. Her face, neck, and arms, were of a very deep purple; her surface clammy, and, together with the tongue and mouth, deadly cold; pulse gone at the wrist; she breathed slowly and deeply; the stethoscope ascertained that the respiration was free, and that the lungs were fully

dilated. She lay on her right side, occasionally turning towards her back; did not complain, and seldom asked for water. She spoke none, except when roused, and then answered only in monosyllables, and in a whisper. The cramps were not troublesome, and the discharges from the bowels small; urine suppressed; her general appearance struck me as that of a person who had been knocked down and long exposed to cold. A mustard emetic produced free vomiting. A vein was opened, and a small quantity of blood obtained; but, after the arm had been tied up, and while she was lying on it, the blood flowed freely, and some ounces were lost. Stimulants and heat were used, but she died at two o'clock sitting on the night chair, to which she insisted on being raised. In this case the flow of blood did not prove the harbinger of returning vital energy, nor did it alleviate the symptoms. I was surprised by its spontaneous flow; and remarked particularly the depression of the mental powers, the patient rarely answering questions until slightly shaken. Death occurring in the erect posture in this, and many other cases, shows the impropriety of even lifting the head in this disease. The fatal termination is probably caused by a diminution of the already small quantity of blood in the brain.

Having emptied the stomach, and taken a few ounces of blood, we next allay the irritation of the bowels, by throwing up a large quantity of water as warm as the mucous membrane can bear, with the addition of a tea-spoonful of laudanum. This in several cases was found useful in allaying irritation and increasing heat.

Counter-irritation towards the close of the stage of

collapse cannot be effected by ordinary measures. At the same time, those patients whose skin resists the stimulants already mentioned, properly applied, are nearly beyond hope. I have repeatedly seen a mustard plaster cause great agony after the pulse had ceased; rubefacients in similar cases could not be endured, heat is at all times disagreeable, and the intolerance of the surface, while vital energy seems nearly extinct, is very remarkable. The actual cautery, if not previously employed, should now be had recourse to.

At the same time that we are enforcing the measures detailed, we must give stimulants. There is no impropriety, in this stage, in using the lancet and diffusible stimuli at the same moment. The former relieves congestion, and indirectly increases the power of the heart; the latter acts on it as a direct excitant. Stimuli may be given with a more liberal hand than in the acute stage, but with the same precautions. We must not, however, carry our dread of stimuli so far as to allow our patients to sink, but in proportion as the collapse gains ground upon us, increase our exertions against it. Laudanum ought to be given in moderate doses as a stimulant. I do not believe that any individual diffusible stimulus possesses superior qualities in this disease, but offer the following as an example of what may be employed. Two table-spoonfuls of brandy, half-a-tea-spoonful of laudanum, a tea-spoonful of ammonia, and two tea-spoonfuls of sulphuric ether, may be mixed together, and a tea-spoonful given in a table-spoonful of hot water every five, ten, or twenty minutes, according to the effects produced. A few doses of stimuli may be

given before the arrival of the medical man, but they ought not to be pushed far without his sanction : their effects on the pulse and head must guide their employment. Another very good form of stimulant, is a strong compound tincture made of capsicum and various aromatics. Half a tea-spoonful may be given with two tea-spoonfuls of brandy and a little hot water, at the same intervals as recommended for the last. Our object is to introduce into the system, a sufficient quantity of a simple diffusible stimulus, and the formula may be left to the choice of individuals. It is often a very difficult matter to make patients take a sufficient quantity of stimulants. They complain that they increase their internal burning sensations, and beg earnestly for cold water. In cases where they are absolutely required, patients must be urged to swallow them. Some practitioners are in the habit of allowing their patients to allay their thirst, but I have always seen water vomited if swallowed in more than a mouthful or two at a time. We are also advised to give the water acidulated ; but as our object in giving cold drink is to gratify the suffering patient, we should give it in the most agreeable form. The disappointment expressed when any thing is substituted for plain cold water is excessive, and in this respect, the thirst of Cholera differs remarkably from that of Fever, in which the taste of water is frequently nauseating. The patient should be encouraged to moisten his mouth without swallowing much liquid. Arrow root made thin often remains on the stomach when nothing else can be retained, and should be given in small quantities at a time.

While we are giving stimuli, the state of the sur-

face must be most assiduously attended to. This part of the treatment may be divided into general and local. The general temperature of the room should be kept as high as seventy or seventy-five by means of stoves or large fires. A very simple method of heating a room, is an iron tube bent at its centre, the bent part enlarged into a small reservoir. The reservoir is put into the fire and heated red hot; to the one end of the iron tube another of tin or of patent cloth is attached, along which water is poured, and being speedily converted into steam, escapes at the opposite end, and is diffused through the room. One of this kind was described to me at Newcastle; the principle might easily be improved into a very efficacious means of raising the temperature of a room to any required height. The air bath is another means of applying heat to the surface generally, but air being a bad conductor must not be trusted to alone. Tin cases containing hot water, light, and shaped to apply to any part of the body, are very useful for applying heat locally; to the same class belong bricks, bags of heated salt or sand, hot plates, and many others. My friend, Mr. Brady, at Gateshead, was in the habit of using bran mashes for communicating heat to the surface with good effect. A quantity of bran is put into a tub and boiling water poured into it in such quantity as merely to moisten it. It is then thinly spread in a bag sufficiently large to cover the whole body, and applied from the neck to the feet. It must not be applied too hot. This mode has the advantage of retaining the heat long, and is one of the best forms of moist heat which I know. If we wish to excite

the surface powerfully, we may add spirits of turpentine to the bran. It is exceedingly difficult to prevent the patient from tossing in bed, withdrawing himself from the heated bags, and throwing off the bran and bed clothes. A nurse must be constantly beside him and prevent this as much as possible.

When the perspiration is profuse and cold, it should be carefully wiped off with dry hot towels. No heat will be communicated to the skin unless this be attended to. The surface being dried, camphorated or ammoniated oils should be long and diligently rubbed on those parts of the body to which irritants are not applied. Smearing the whole skin with some unctuous substance might check perspiration and lessen evaporation.

It must never be lost sight of in treating the collapsed stage of Cholera, that our grand indication is to rouse the dormant nervous energy; we may pour stimuli into a dead stomach, and heat a lifeless surface, without a hope of exciting animation: we must beware that this objection be not applicable to our treatment of Cholera. The measures already recommended for application to the sources of nervous energy, must be vigorously employed; and among them I would class Galvanism. My friend, Dr. A. D. Anderson, tells me, that his brother, a medical officer in the Honourable Company's Madras Service, has found it useful in two cases. The wire should be applied along the course of the eighth pair of nerves in the neck, and over the regions of the heart and stomach. Were I the subject of a severe attack of this stage, I would not hesitate to have the eighth pair of nerves laid bare in the neck, and the wire

applied to their surface. There was a small trough in the Sandgate Hospital at Newcastle, but it was too weak to produce any recognisable effects. A powerful galvanic battery should form a part of the apparatus of every Cholera hospital.

To this class of remedies I would add calomel. I have often been asked, what effect calomel can have on a stomach deprived of nervous power. It appears to me that the vital energy, as indicated by partial returns of the pulse at the wrist, is occasionally revived: a few grains of calomel lying in the stomach can do no harm, and are ready to be absorbed at these times. On this account I would be inclined to give it in moderate doses along with stimuli.

Several remedies of more doubtful character were employed at Newcastle and Gateshead. I may mention the following: Oxygen gas was given both by inhalation and enema, but so far as I observed, with very little benefit. *Case 3d.* A woman, aged 35, was taken ill with Cholera about nine o'clock in the mornning, and was admitted into the Sandgate Cholera hospital. At seven P. M. the pulse was gone at the wrist, she was cold, exceedingly restless, and very thirsty. Among other measures, I made her inhale eight ounces (by measure) of oxygen gas, and threw into the rectum two bladderfuls heated, without producing any visible effect. She died at four in the morning, in spite of the energetic employment of heat, frictions, and stimuli. It has been recommended to throw large quantities of heated air into the bowels, with the view of checking the discharges and increasing heat; I think the remedy worthy of a trial.

Stimulating enemata composed of spirits of turpen-

tine and mustard, were in common use with some practitioners. The theory, however, of their operation is very questionable, and they were frequently found to produce irritation of the rectum and bloody stools. Mr. Baird of Newcastle, used the tobacco enema, in one case of collapse with seeming decided benefit. I tried it in the following cases. *Case 4th.* An old woman, who had been for some hours ill, and of whom I obtained a very imperfect account, was admitted on the afternoon of the 29th December, into the Gateshead Cholera hospital, in the collapsed stage. Her stomach was not acted on by mustard and salt swallowed in large quantities. An infusion of tobacco of the strength of a drachm of the leaf to a pound of water was thrown into the rectum; no effect whatever was produced: after three or fours hours, the dose was repeated with a similar result. She died next morning. Probably the case was hopeless at the time I first saw her. *Case 5th.* Jane Crawford, aged 14, was admitted into the Gateshead Cholera Hospital, at twelve o'clock on Friday, 30th December. She was taken ill early in the morning, was cold, purple, and pulseless, her breathing short, catching, and difficult, apparently from spasm of the diaphragm. She complained also of cramps in her legs and arms. A mustard emetic was ordered, but attempts to swallow it produced such spasms of the muscles of the throat as to endanger suffocation. She did not vomit. I then proposed bleeding her, but was induced to try the tobacco enema. A pint of the same strength as in the last case was injected; in three minutes she vomited freely a large quantity of fluid closely resembling in colour the enema, but without

any smell of tobacco. The pulse returned to the wrist and heat partially to the surface. She had an urgent call to stool, which I encouraged, because part of my object in giving the tobacco was obtained, and I feared its subsequent depressing effects. She could not use the bed pan, and insisted on being lifted to the night chair. In this her mother gratified her; she passed the enema, the spasms returned, and on being laid in bed, her body was bent back almost into a semicircle, her forearms were bent up to her chest, her fists clenched, and jaw fixed; in two minutes she was dead. This last case should make us cautious in the use of this powerful remedy. I do not, however, think it conclusive against its employment, because the spasms were more violent in the muscles of the upper part of the body, than in any case I ever saw. Probably the dose was too large.

The amount of labour, assiduity, and attention, which are necessary to bring a patient through the stage of collapse, can be known to those only who have experienced it. Nature does next to nothing, the surgeon must do every thing, and he must beware that he does not despair before hope is lost. A medical man left a Cholera patient, saying, that he could do no more for him, and that he must die; another surgeon, passing by accident, was asked to see him, he worked hard for four hours and recovered him.

4. Rallying stage.—After the stage of collapse has been combated for several hours, the heat returns to the surface, and the pulse becomes steadily perceptible, although very weak. The *manual labour* of the surgeon is now at an end, nature resumes her office, and the duty of the surgeon is limited to watching and

guiding her operations. As in other diseases in which rallying follows shock, stimulants cannot be given, and perhaps the less the surgeon does, the more successful will be his practice. He has two extremes to avoid; to prevent the patient falling back into collapse, and ward off congestions of the head and viscera. The first is avoided by keeping up external heat and giving warm arrow-root in moderate quantities; the second, at this stage, is best combated by small doses of calomel. We must be careful not to push this medicine too far, more especially if much of it has been given in the previous stages, as salivation is very apt to follow. The head should be shaved. In some cases the stomach continues exceedingly irritable. Blisters over its region, and effervescing draughts, with a few drops of laudanum, are generally successful in calming it. The less the patient swallows the better.

5. Febrile stage.—I need say little of the treatment of this stage when congestion does not occur. A few grains of calomel to restore abdominal secretions, small doses of castor oil and acidulated drinks are generally sufficient. Small doses of Dover's powder combined with the calomel are useful. Even when congestion threatens, it is by no means certain that bloodletting is admissible. *6th Case.* Alice Wishart, after being two days in Gateshead Cholera Hospital, and passing through the collapse and rallying stages, was verging into fever, with threatened congestion of the head. Two experienced medical friends who saw her strongly advised me to bleed her; I took away a few ounces of blood, and in two hours found her cold, blue, and nearly pulseless. Stimulants were again necessary, and I left her in the febrile stage.

When the congestion is seated in the head, blisters to its surface or the nape of the neck, preceded, if necessary, by leeches and cold lotions, and followed by calomel and mild purgatives, are safe and efficacious. The same principles apply to abdominal congestions. The principal danger in the febrile stage arises from congestion of the head. When severe, the patient very frequently dies. I saw a woman in the Sandgate Hospital, and a boy in the Gateshead, die from this cause, with all the symptoms of the worst forms of typhus.

I shall conclude my observations with a very short comparison of the disease in England with that in India.

I need hardly say, that to me, the two diseases appear closely to resemble each other in their modes of propagation, both of them being communicable from man to man, and under the influence of atmospherical changes and local causes. The English disease has hitherto been less contagious than the Continental, and more confined to localities than the Indian.

I have already compared their character, symptoms, and treatment.

Great variety has obtained in different parts of the world, in the proportion which those attacked with Cholera bore to the population, and those who died to those who were seized. In some towns of Syria it destroyed one half of the population; in Tripoli only 1 in 3,000! In India, the proportion of the troops exposed to those attacked, varied from 1 in 10, to 1 in 20; and the deaths, from 1 in 3, to 1 in 6 of those seized. Among the native population, many of whom were devoid of the necessaries of life, and all of medical aid, the mortality ran as high as one half or two-thirds. In Russia, according to Moreau

de Jonnés, in five months, 1 in 210 of the population exposed were attacked, and 1 in 350 died. The deaths amounted to three-fifths of the seizures.

In England and Scotland, from October 26th, 1831, to January 12th, 1832, 1779 have been afflicted with Cholera, and 613, (upwards of one-third) have died.

In Sunderland, from which town the disease has now disappeared, 533 have been seized, and 210 died, affording a mortality of upwards of one-third. I have found some difficulty in ascertaining the amount of the population of Sunderland, but conceive that the town itself does not contain more than 20,000. On this calculation the seizures are as 1 in $37\frac{1}{5}$, and the deaths 1 in 95, of the population. We cannot arrive at any accurate conclusions regarding Newcastle, because the disease still prevails there; up to the 12th January, however, the deaths are less than one-third of those attacked.

In Gateshead, on January 13th, the report shewed that, in nineteen days, (from 25th December, to 13th January) 369 had been attacked, 128 had died, 225 had recovered, 16 remained. On the 13th there were no new cases, and if we suppose that three-fourths of those remaining will recover, we shall have total 369, deaths 132, recoveries 237, the deaths amounting to a fraction more than one-third, and the recoveries to less than two-thirds. The population of the whole parish of Gateshead is 15,000, consequently the seizures were rather more than 1 in 41 of the whole population, and the deaths 1 in 113.

From these data we may draw the following conclusions :—

First. The numbers attacked, in proportion to the population of the places infected, are more than five

times greater in Sunderland and Gateshead than in the Russian dominions; and the deaths to the population more than three times. The seizures are nearly one half less than among our troops in India.

Second. The proportion of deaths to seizures is 1½ higher than among our Indian troops, and considerably lower than among the Russian peasantry.

Third. When we consider that this disease is limited to the inhabitants of certain localities, its effects on families must be fearful. It was no uncommon occurrence to meet with two, six, or even eight of the same family stricken with it, within a few hours. The picture is aggravated when we recollect that the disease selects its victims from that class of the community, who are least able to sustain any addition to their misery.

Fourth. The statement, that Cholera does not increase the bills of mortality, is not correct. The average number of deaths in Gateshead was nearly eighteen monthly. In that parish the deaths from Cholera alone, in nineteen days, were 7⅕ times that amount.

I trust it is unnecessary for me to say, that I have not made these statements, nor any of those contained in this treatise, with the criminal intention of creating alarm, but to prove that a disease is now in Great Britain, more severe on certain classes of society, and incomparably more fatal, than any which has for many years afflicted this country; and that it is the duty of the Government, communities, and individuals, instantly to adopt those measures which reason and experience prove are best adapted for its immediate alleviation, and ultimate expulsion from the kingdom.

APPENDIX.

Note A.

Whether we adopt the opinion, that the apparently endemic character of Cholera, is owing to causes generated in certain localities, or, that it is to be attributed to the habits and predisposition of those attacked; and whatever views we may entertain of the measures to be adopted for its ultimate eradication, there can be but one opinion as to the propriety of public and private efforts to diminish dissipation and poverty. To lessen the last of these causes of disease, coals, food, blankets, and clothes, should be liberally distributed. In Gateshead, to prevent the poor selling the blankets given in charity, it was found necessary to stamp them in the centre, "Lent by the Board of Health," and to warn the pawnbrokers, that to receive them, would be deemed a punishable offence. Personal cleanliness, purification of houses by washing, fumigation, and large fires were encouraged.

An Hospital, besides the articles mentioned in different parts of the text, should have attached to it convenient vehicles, for removing patients. No Cholera patient should be carried in the erect posture; in all stages it is injurious—in that of collapse, almost certainly fatal. A litter—sea-cot with a pole on each side—or a moveable frame attached to a hand-barrow, will be found very convenient. Perhaps a wooden frame covered with painted canvass, like a sea-cot, with very short feet, and a pole at each side, not longer than is sufficient to enable it to be easily carried, is the best which can be used. It should be placed along side the patient's bed, and he being laid in it, ought not again to be removed, until he reach his bed in the Hospital. Every vehicle for Cholera patients, must have a moveable awning, composed of a light frame covered with painted canvass, or patent cloth, and ought to contain light tin cases filled with hot water, and abundance of blankets. Unless these precautions be attended to, removing a Cholera patient to the Hospital may prove fatal. Each time the cot is sent out, a steady nurse or porter

ought to accompany it, with instructions to enforce the above precautions. On the same principle, a patient must never be allowed to raise himself in bed. Before lifting the patient into bed, all his clothes should be taken off, and a long flannel night-gown well heated, of which the Hospital ought to contain an abundant supply, put on. It is convenient to have the gown made with long sleeves, and a hood, and to open on the chest and back. Light tin cases for hot water, bags for heated bran, salt, or sand, and hot plates are the most convenient methods of applying heat.

The Apothecary's department of a Cholera Hospital, does not require to be very extensive. It ought to contain medicines made up according to simple formulæ, and ready for immediate use.

The stock of medicines in private houses, need not to be great, mustard powder, brandy, laudanum, ether, ammoniated spirits, "liquor ammoniæ," turpentine, capsicum in powder and tincture, castor-oil, and calomel, are sufficient for the treatment of the worst cases of Cholera. Juke's apparatus is useful on many occasions.

Perhaps a simple reference to the various proclamations issued by Government, and Boards of Health, might have rendered this note unnecessary.

THE END.

E. Khull, Printer, 65, Virginia Street.